Abstract

The present study addressed the need for furan mitigation measures at the level of food production, where the effects of extrinsic (process-related) and intrinsic (product-related) properties on furan formation in vegetable-based systems were investigated. For the first time in the literature, the effect of high pressure-high temperature (HPHT) processing on the formation of furan was demonstrated. HPHT processing was proven to be an interesting alternative for furan reduction in vegetable-based systems, when aiming for sterilization intensities. Following HPHT treatment, the furan concentrations of a wide range of individual vegetable purées dropped to levels close to the analytical limits (1-2 ng/g purée). A higher processing cost might limit the use of HPHT processing to high-value added products, which means that for many other conduction-heated food products, conventional heating would remain the standard technology. As a first step towards control of furan formation in the latter products, a mixed model regression was used to identify the major precursors in vegetable-based systems. Significant correlations were observed for vitamin C and sugars, which were attributed to the efficiency of the conversion and high concentrations, respectively. Next to furan, the HPHT- and thermally-treated purées were analyzed for 2- and 3-methylfuran, which are likely to undergo the same metabolic fate as furan. For most of the vegetables tested, the total amount of methylfuran found in the thermally-treated purées could not be ignored. Similarly to furan, there was a clear reduction in the concentrations found in the HPHT-treated purées.